(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 085 514 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.03.2001 Bulletin 2001/12

(51) Int Cl.[7]: **G11B 23/00**, G06K 19/04

(21) Application number: **99830571.8**

(22) Date of filing: **10.09.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **International Consulting S.r.l.**
20059 Vimercate (MI) (IT)

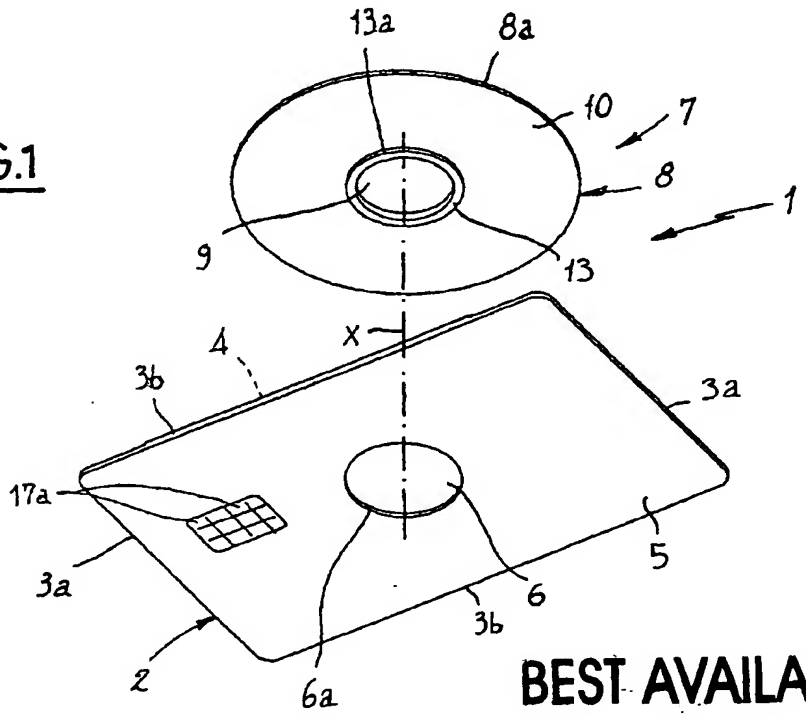
(72) Inventor: **Perego, Luciano**
20050 Mezzago, MI (IT)

(74) Representative: **Tansini, Elio Fabrizio**
C/O Bugnion S.p.A.
Viale Lancetti, 19
20158 Milano (IT)

(54) Data storage unit

(57) A support card for digital memories comprises a flat support (2) of standardized rectangular conformation, having a first face (4) and a second face (5) and being provided with a centrally-disposed through opening (6). Formed in the first face (5) is a surface recess (11) for receiving a DVD disc-half constituting a first storage unit (7). A steady engagement of the first storage unit (7) on the flat support (2) is achieved by a collar (13) disposed close to a centering through hole (8) presented by the storage unit (7), and intended for coupling, by forced fitting, with the through opening (6).

FIG.1



EP 1 085 514 A1

Description

[0001] The present invention relates to a data storage unit, of the type comprising the features set forth in the preamble of claim 1.

[0002] In particular, the storage unit in reference is conceived for being associated with a card of standardized rectangular shape, of the type usually used as credit card or telephone card for example.

[0003] It is known that cards of the above mentioned type are essentially defined by a plate-like or flat support of plastic material with which a digital memory unit is associated.

[0004] In a first known type of card, the digital memory essentially consists of a magnetic band extending over one of the two opposite faces of the flat body, parallelly of one of the major sides of said body.

[0005] In a second known type of card commercially identified as "Smart Card", the digital memory is essentially made up of a microchip incorporated into the thickness of the flat body and having contact elements appearing on one of the faces of the flat body itself.

[0006] Also proposed in recent times have been cards of standardized rectangular shape in which the digital memory is of the optical type, i.e. of the type commonly utilized in manufacturing compact discs.

[0007] Embodiments of these cards are described in Patent Applications JP 4040586 and WO 99/00765.

[0008] Modalities for accomplishing known cards having an optical memory and the consequent structure of same do not have important differences as compared with the features usually encountered with reference to compact discs. In conclusion, a known card with an optical memory essentially consists of a compact disc of rectangular conformation, in which the area intended for data storage is delimited by an annulus substantially tangent to the major sides of the card and concentric with a through opening disposed at a centered position on the card itself.

[0009] Appropriate centering elements, embodied for example by ridges in the form of an arc of a circle or projections of different shape are arranged on a reading face of the card, intended for resting on an extractable tray being part of an usual reading unit for compact discs, in order to enable correct positioning of the card itself on said tray.

[0010] After the above statements, the Applicant has wished to analyse the possibility of providing a card with greatly improved versatility of use and memory capabilities as compared with the cards of the known art. In particular, the Applicant has aimed at enabling coexistence of several memory units even of different typologies on one and the same card, as well as the opportunity of omitting, removing and/or replacing at least one of the memory units to be combined with the card itself.

[0011] In accordance with the present invention, the foregoing and further aims that will become more apparent in the course of the present description are attained by a memory unit comprising the features set forth in the characterizing portion of claim 1.

[0012] Further features and advantages will be best understood from the detailed description of a preferred but non-exclusive embodiment of a memory unit in accordance with the present invention, in combination with a support card with which the memory unit in reference will be associated. This description will be taken hereinafter with reference to the accompanying drawings, given by way of non-limiting example, in which:

- Fig. 1 is an exploded perspective bottom view of a memory unit in accordance with the invention, associated with a respective support card;
- Fig. 2 shows the memory unit mounted on the card of Fig. 1;
- Fig. 3 is a view to an enlarged scale of a flat support being part of the card to be used in combination with the subject memory unit, seen from the opposite side relative to Fig. 1;
- Fig. 4 is an exploded perspective top view showing a second embodiment of the invention;
- Fig. 5 shows the memory unit and card in Fig. 4 in an assembled condition;
- Fig. 6 shows a flat support being part of the card shown in Figs. 4 and 5, to an enlarged scale;
- Fig. 7 is a section taken along line VII-VII in Fig. 2, showing coupling between the subject memory unit and the flat support, in accordance with a preferential embodiment of the invention;
- Fig. 8 shows an alternative embodiment in respect of Fig. 7;
- Fig. 9 is a section taken along line IX-IX in Fig. 5, showing a different embodiment for achieving coupling between the first memory unit and the flat support;
- Fig. 10 shows an alternative embodiment in respect of Fig. 8.

[0013] With reference to the drawings, a support card for a data storage unit to be used in combination with a memory unit accomplished in accordance with the present invention has been generally identified by reference numeral 1.

[0014] Card 1 essentially comprises a flat support 2, preferably made of plastic material, having a perimetral edge of a substantially rectangular profile defined by minor sides 3a and major sides 3b preferably of standardized sizes, corresponding to those of a conventional credit card.

[0015] The perimetral edge 3a, 3b delimits, on the flat support 2, respectively opposite first 4 and second 5 faces having a through opening 6 preferably disposed at a centered position in the flat support 2. In more detail, the through opening 6 has a geometric axis "X" intersecting the crossing point between the diagonals in the rectangular configuration of the flat support 2.

[0016] The first face 4 is advantageously intended for

carrying a first data storage unit 7, hereinafter referred to as first storage unit, circumscribing the through opening 6.

[0017] The first storage unit 7 is preferably of a disc-shaped type, i.e. it comprises a plate-like body 8 having a centering through hole 9 and at least one area 10 for data storage, preferably of the optical type, such disposed as to form an annulus extending concentric with the centering through hole 9 and substantially tangent to the major sides 3b of the flat support 2.

[0018] In particular, it is preferably provided for the first storage unit 7, or at least the plate-like body 8 thereof, to be essentially defined by a DVD (digital versatile disc) disc-half the outer diameter of which substantially corresponds to the size of the minor sides 3a of the flat support 2. To the ends of the present description, by "disc-half" it is intended one of the two disc-shaped elements that are usually coupled in mutual superposition relationship when DVDs following conventional techniques are made. In this connection please see document EP 866450 for further explanations and information on how DVDs are made.

[0019] The plate-like body 8 preferably has a circular conformation, delimited by an outer circumferential edge 8a, but the plate-like body may also have a different conformation, a quadrangular conformation for example, provided it is contained within the extension of the perimetral edge 3a, 3b of the flat support 2.

[0020] Disposed on the first face 4 of the flat support 2, at the through opening 6, is means for engagement of the first storage unit 7, preferably comprising a surface recess 11 formed on the first face itself. The surface recess 11 is able to house the first storage unit 7 when the latter, through a locating surface 7a thereof, is brought in abutment on the surface recess itself.

[0021] Preferably, the shape of the surface recess 11 matches that of the first storage unit 7 and its depth corresponds to the thickness of said storage unit. In this way the first storage unit 7, when housed in the surface recess 11, has a reading surface 7b disposed flush with the first face 4 of the flat support 2.

[0022] In particular, in the embodiment shown, the surface recess 11 has a circular conformation and is delimited by a circumferential ridge 12 substantially tangent to the major sides 3b of the flat support 2.

[0023] Advantageously, engagement of the first storage unit 7 with the flat support 2 further involves the aid of mechanical-interfacing means comprising a fitting element for example for engagement between the storage unit itself and the support card 1, preferably in a removable manner.

[0024] This mechanical-interfacing means preferably comprises a collar 13 axially projecting from the locating surface 7a at the centering through hole 9 having an inner diameter corresponding to that of the centering hole usually provided in a conventional compact disc or DVD. Collar 13 defines a shoulder 13a turned away from the geometric axis of the through hole. Shoulder 13a is able to cooperate with an inner circumferential edge 6a of the through opening 6 to accomplish a tight mechanical-interference fit with said opening.

[0025] In a preferential embodiment shown in Fig. 7, shoulder 13a of collar 13 has a substantially cylindrical conformation in the same manner as the inner circumferential edge 6a of the through opening 6. The outer diameter of collar 13 is slightly greater than the inner diameter of opening 6, so as to carry out a tight interference fit of the collar into the opening.

[0026] In accordance with an alternative embodiment shown in Fig. 8, it may be advantageously provided that shoulder 13a defined by collar 13 and/or the inner circumferential edge 6a of the through opening 6 should be of truncated conical form. In this manner shoulder 13a defines an undercut turned towards the flat body 8, whereas the inner circumferential edge 6a defines an undercut turned towards the second face 5 of the flat support 2. Due to the presence of these undercuts a mechanical-interference snap fitting of collar 13 in opening 6 occurs.

[0027] To make snap-fitting easier, radial cuts may be advantageously arranged at collar 13 and/or opening 6, which cuts divide the collar itself and/or the inner circumferential edge 6a into a plurality of elastically-deformable portions in the form of an arc of a circle.

[0028] In a different embodiment, shown in Figs. 4, 5, 9 and 10, instead of collar 13 associated with the first memory unit 7, at least one grip lug 14 formed at the inner circumferential edge 6a of said through opening 6 is provided to be arranged. The grip lug 14, preferably having an annular conformation concentric with the through opening 6, defines a coupling ridge 14a facing away from the geometric axis X of the through opening 6, to engage by interference fit the centering hole 9 arranged in the first storage unit 7. In this embodiment, the through opening 6 will have the same inner diameter as the centering hole usually provided in compact discs or DVDs, whereas the centering hole 9 arranged in the first storage unit 7 will have a conveniently bigger diameter.

[0029] In this case too, both the grip lug 14 and the centering hole 9 may have a cylindrical configuration, with diameters slightly differentiated from each other to cause mutual coupling by forced fitting (Fig. 9). Alternatively, the grip lug 14 and/or centering hole 9 may be of truncated conical form as shown in Fig. 10, so as to define mutually opposite undercuts facing the second face 5 of the flat support 2 and the reading surface 7b of the first storage unit 7, respectively.

[0030] In addition to, or in place of collar 13 and/or the grip lug 14, the outer circumferential edge 8a of the plate-like body 8 and the circumferential ridge 12 of the surface recess 11 could be such arranged that mutual engagement by mechanical-interference fit will occur. Said outer circumferential edge 8a and circumferential ridge 12 may have a cylindrical configuration, with differentiated diameters to obtain forced coupling of the

plate-like body 8 into the surface recess 11. Alternatively, the outer circumferential edge 8a and/or circumferential ridge 12 may have, at least as regards part of their circumferential extension, a frusto-conical conformation, to form mutually opposite undercuts facing the reading surface 7b and the surface recess 11, respectively.

[0031] Further associated with card 1 may be means 15, 16 for centering the flat support 2 in a reading and/or data recording device on the first storage unit 7, not shown as known per se and conventional. Advantageously, this centering means 15, 16 may comprise centering shoulders 15 defined by auxiliary surface recesses 16, of a curved profile for example, formed in the first face 4 close to the minor sides 3a of the perimetral edge of the flat support 2.

[0032] In addition, associated with the support card 1 may advantageously be at least a further data storage unit 17 accessible from the second face 5 of the flat support 2. This further storage unit 17 can be advantageously made in the form of a microchip incorporated into the flat support 2, within a seat arranged therein, and having contact elements 17a appearing from the second face 5.

[0033] The present invention achieves the intended purposes.

[0034] Unlike the known art, in which any type of memory must necessarily be accomplished as a single unit with the flat support of the card, the invention enables a memory unit, in particular of the optical type, to be associated with the card, subsequently to production of the card itself. This circumstance opens a great number of new possibilities of use of the cards as digital memory media.

[0035] In particular, it is for example possible to arrange a card provided with a fixed digital storage unit, of the microchip type for example, with which an optical memory, optionally interchangeable, may be associated in case of need.

[0036] The optical memory made in the form of a DVD disc-half can also advantageously coexist with a microchip memory even if, as it appears from the depicted examples, these memories extend over mutually superposed regions on the flat support. This would be impossible if the optical memory were made in the form of a compact disc, because thickness of said memory, corresponding to the overall thickness of the card, would involve penetration, by the microchip memory, into regions intended for receiving optical data.

[0037] On the contrary, due to use of a DVD disc-half, of a thickness of 0.6 mm, a sufficient thickness is left free in the flat support for housing the microchip memory without the latter projecting in the surface recess 11 and thereby occupying regions intended for the optical memory. In this connection it is to be noted that, due to dimensional standardization of the cards of the type in reference, thickness of same must not exceed 1.2 mm, of which thickness the microchip memory only engages about 0.5 mm.

[0038] It should be also appreciated that since several memory units can be integrated into one and the same card, there will be an increase in the amount of data storable on the card itself. In addition, with use of a DVD optical memory, storage capacities close to about 1 GB may be easily obtained.

Claims

1. A data storage unit, comprising a plate-like body (8) having a centering through hole (9) and at least one region (10) intended for data storage and extending concentric with said centering through hole (9), characterized in that it further comprises mechanical-interfacing means (13) for engagement of said storage unit (7) on a support card (1).

2. A storage unit as claimed in claim 1, wherein said mechanical-interfacing means comprises at least one tight fitting element (13).

3. A storage unit as claimed in claim 1, wherein said mechanical-interfacing means comprises a collar (13) axially projecting at said centering through hole (9) and defining a shoulder (13a) facing away from a geometric axis of the through hole (9) and arranged to get engaged by interference fit in a through opening (6) formed in said support card (1).

4. A storage unit as claimed in claim 1, wherein said shoulder (13a) defines an undercut turned towards the plate-like body (8).

5. A storage unit as claimed in claim 1, wherein said mechanical-interfacing means comprises an edge of said centering through hole (9) arranged to engage, by interference fit, a grip lug (14) arranged on said support card (1).

6. A storage unit as claimed in claim 5, wherein the edge of said through hole (9) forms an undercut turned towards a reading face (7b) of said storage unit (7).

7. A storage unit as claimed in claim 1, wherein said mechanical-interfacing means comprises an outer circumferential edge (8a) of said plate-like body (8), arranged to engage, by mechanical-interference fit, with a circumferential ridge (12) presented by said support card (1).

8. A storage unit as claimed in claim 7, wherein said outer circumferential edge (8a) defines an undercut turned towards a reading face (7b) of said plate-like body (8).

9. A storage unit as claimed in claim 1, wherein said plate-like body (8) is essentially defined by a DVD disc-half.

FIG.1

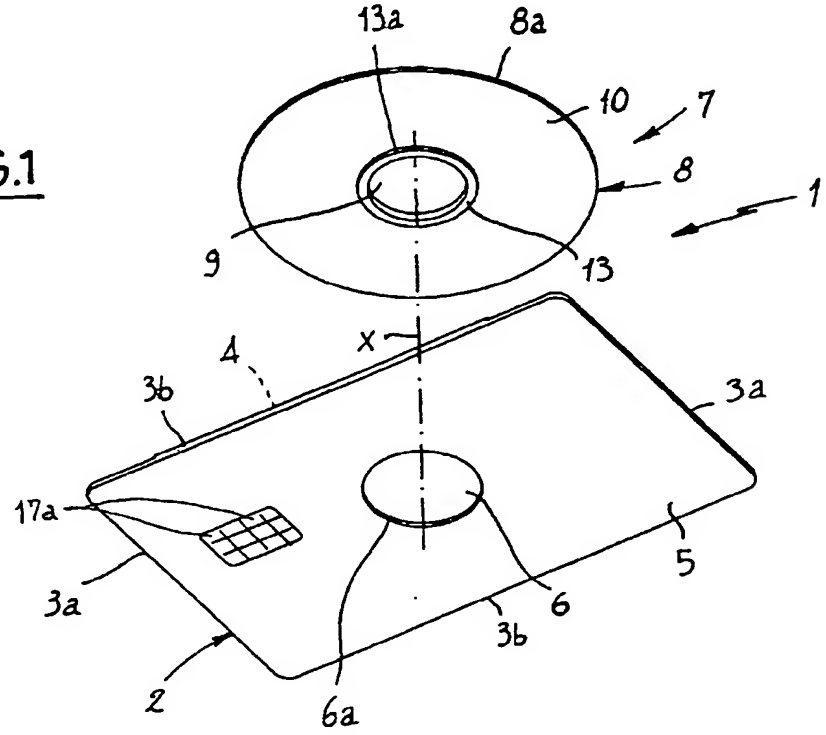

13a
8a
10
7
8
1
9
13
X
4
3b
3a
17a
3a
5
6
3b
2
6a

FIG.2

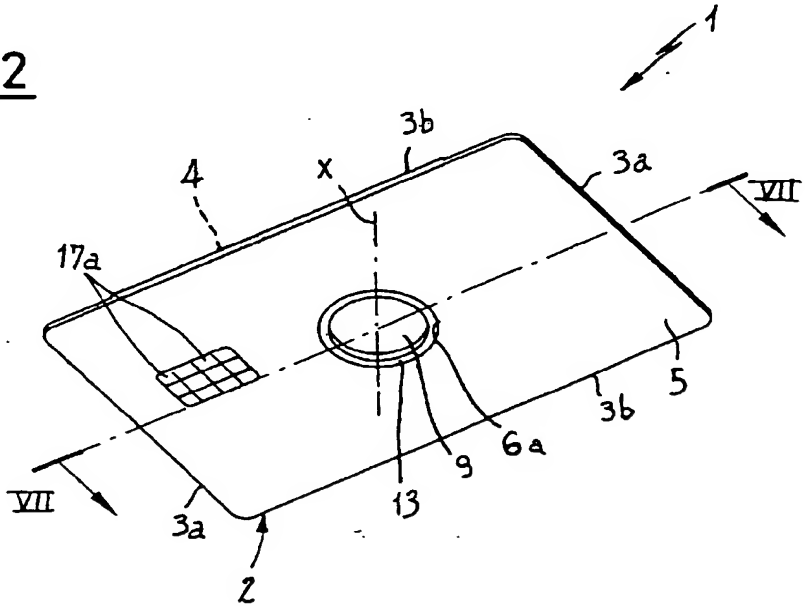

1
3b
4
X
3a
VII
17a
5
3b
6a
9
13
VII
3a
2

FIG4

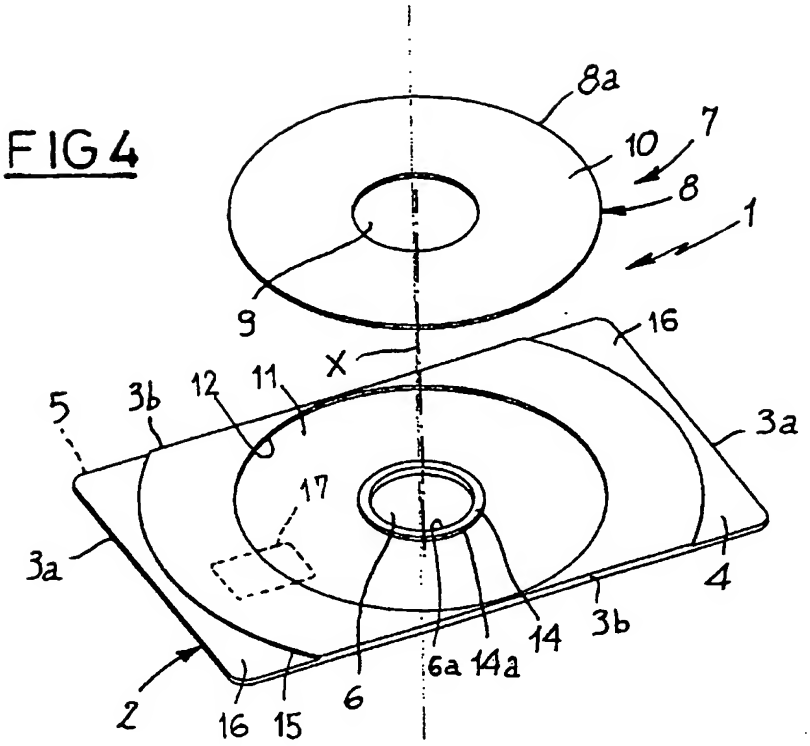

8a
10
7
8
1
9
16
X
5
3b
12
11
3a
17
3a
4
14
3b
6a
14a
2
16
15
6

FIG5

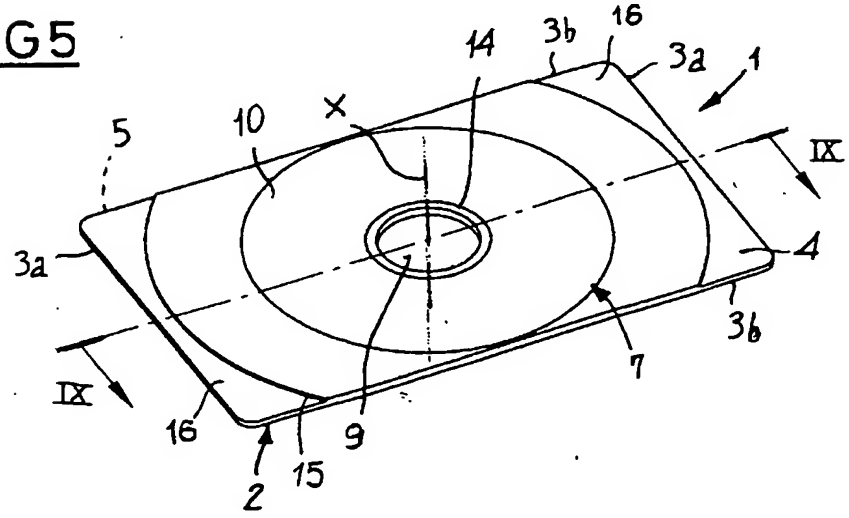

14
3b
16
3a
1
5
10
X
IX
3a
4
3b
7
IX
16
9
2
15

FIG 6

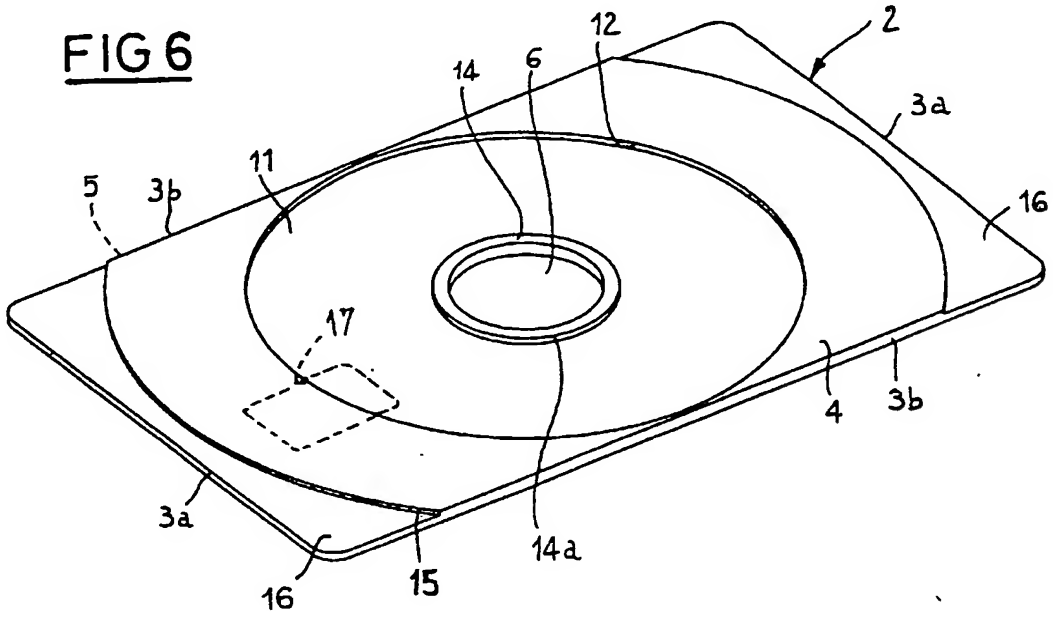
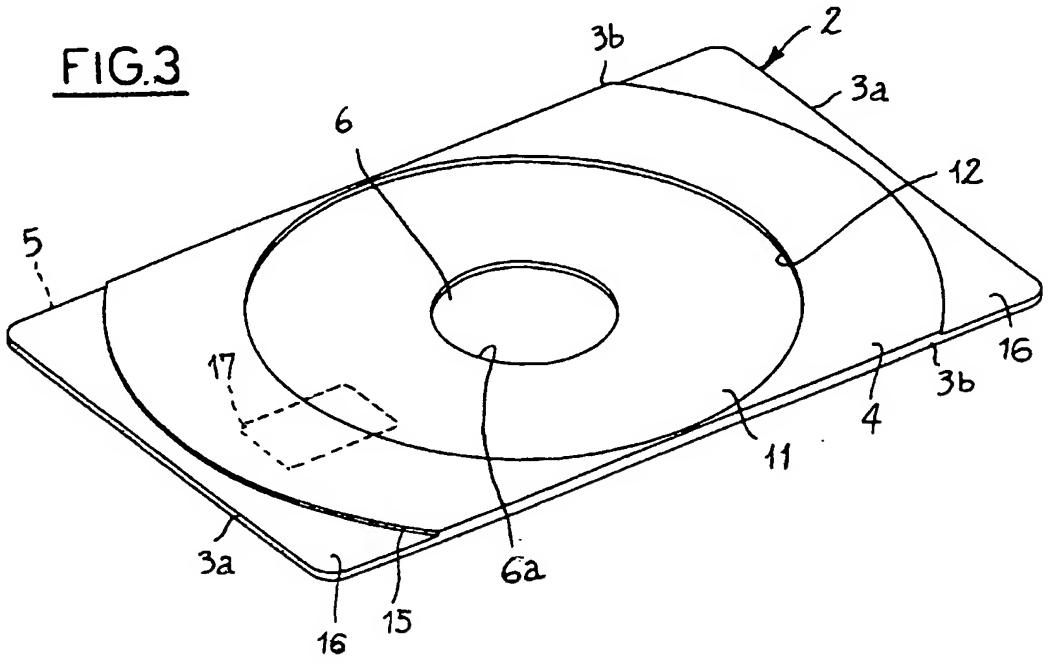

12
2
14
6
3a
11
5
3b
16
17
4
3b
3a
14a
16
15

FIG.3


3b
2
3a
6
12
5
17
16
3b
4
11
3a
6a
16
15

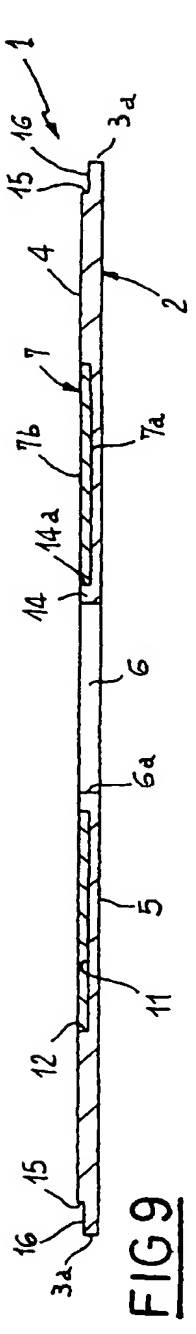


FIG 9

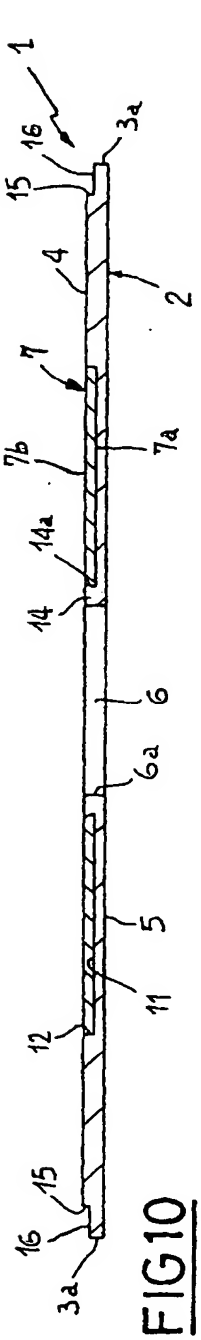


FIG 10

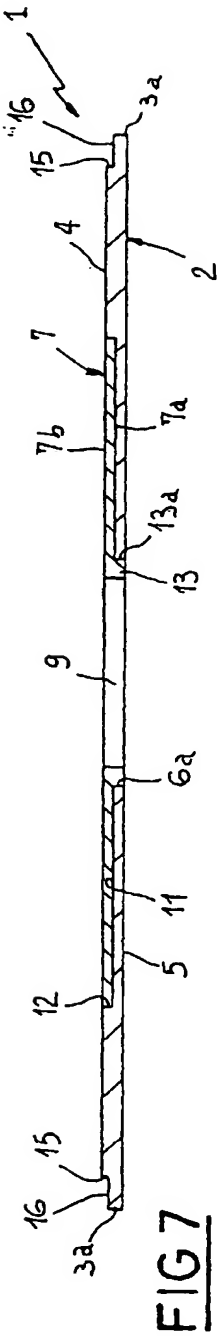


FIG 7

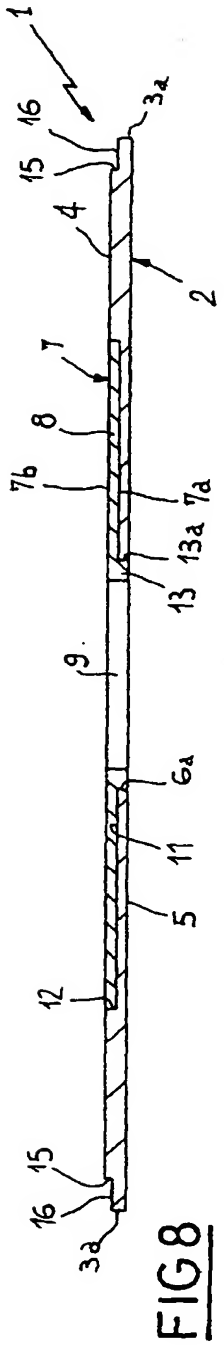


FIG 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0571

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	NL 9 000 256 A (JAN ESSEBAGGERS) 2 September 1991 (1991-09-02) * page 2, line 9 - page 3, line 19; figures *	1,2,7-9	G11B23/00 G06K19/04
X	DE 195 41 306 A (JACOB RAINER) 15 May 1996 (1996-05-15) * column 8, line 1 - line 26; claims 1-11; figures 3,4 *	1,2,9	
X	EP 0 723 266 A (CYBERWERKS INTERACTIVE LLC) 24 July 1996 (1996-07-24) * column 5, line 33 - column 10, line 9; figures *	1,2,4-6, 9	
X	GB 2 059 666 A (MATSUSHITA ELECTRIC IND CO LTD) 23 April 1981 (1981-04-23) * abstract; figures 1-7 * * page 1, line 70 - line 115 *	1,2,4-6, 9	
X	DE 299 03 974 U (SEMPRUCH) 22 July 1999 (1999-07-22) * page 2; claims 1,2; figures *	1,2,7-9	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G11B G06K
X	US 4 903 256 A (NAKAHARA TAKASHI) 20 February 1990 (1990-02-20) * abstract; figures * * column 4, line 5 - line 68 *	1-4	
A	FR 2 641 112 A (GAULTIER JEAN PAUL ;MENUGE FRANCIS (FR)) 29 June 1990 (1990-06-29) * abstract; figures *	1,2	
A	GB 2 239 974 A (HORNE TREVOR LESLIE DARRELL) 17 July 1991 (1991-07-17) * abstract; figures *	1,9	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15 February 2000	Declat, M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0571

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 394 686 A (POLAROID CORP) 31 October 1990 (1990-10-31) * abstract; figures *	1,9	
A	DE 297 09 648 U (OTTERSTEIN KARL) 11 December 1997 (1997-12-11) * claims 1-11; figures *	1,9	
A	EP 0 484 788 A (HITACHI LTD) 13 May 1992 (1992-05-13) * column 13, line 44 - column 14, line 28; figures *	1	
A	DE 297 08 978 U (BLAHA FRANTISEK ING) 10 July 1997 (1997-07-10) * claims 1-4; figures *	1,7-9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15 February 2000	Declat, M

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 83 0571

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
NL 9000256 A	02-09-1991	NONE	
DE 19541306 A	15-05-1996	NONE	
EP 0723266 A	24-07-1996	US 5579296 A	26-11-1996
		AU 690383 B	23-04-1998
		AU 4047595 A	25-07-1996
		BR 9505892 A	06-01-1998
		CA 2165647 A	19-07-1996
		CN 1127406 A	24-07-1996
		CZ 9503369 A	16-07-1997
		FI 956101 A	19-07-1996
		GB 2297187 A	24-07-1996
		HU 3842 A	28-11-1997
		JP 8273319 A	18-10-1996
		NO 955179 A	19-07-1996
		PL 311928 A	22-07-1996
		SG 35482 A	01-02-1997
		SK 159395 A	07-08-1996
		WO 9622598 A	25-07-1996
		US 5869163 A	09-02-1999
GB 2059666 A	23-04-1981	JP 1180575 C	09-12-1983
		JP 54019705 A	14-02-1979
		JP 58008041 B	14-02-1983
		JP 1190666 C	13-02-1984
		JP 54019706 A	14-02-1979
		JP 58023643 B	17-05-1983
		JP 1177958 C	30-11-1983
		JP 54019707 A	14-02-1979
		JP 58008042 B	14-02-1983
		JP 1177959 C	30-11-1983
		JP 54019708 A	14-02-1979
		JP 58008043 B	14-02-1983
		JP 1177960 C	30-11-1983
		JP 54019709 A	14-02-1979
		JP 58008044 B	14-02-1983
		CA 1106665 A	11-08-1981
		DE 2830880 A	18-01-1979
		FR 2397649 A	09-02-1979
		GB 2001191 A,B	24-01-1979
		US 4195844 A	01-04-1980
DE 29903974 U	22-07-1999	NONE	
US 4903256 A	20-02-1990	JP 63228479 A	22-09-1988

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 83 0571

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4903256 A		JP 63106976 A	12-05-1988
		DE 3750420 D	29-09-1994
		DE 3750420 T	26-01-1995
		EP 0265274 A	27-04-1988
FR 2641112 A	29-06-1990	NONE	
GB 2239974 A	17-07-1991	NONE	
EP 0394686 A	31-10-1990	US 4996681 A	26-02-1991
		AU 621478 B	12-03-1992
		AU 5382290 A	25-10-1990
		CA 2011824 A	24-10-1990
		JP 2294981 A	05-12-1990
DE 29709648 U	11-12-1997	NONE	
EP 0484788 A	13-05-1992	AU 638876 B	08-07-1993
		AU 8687691 A	11-06-1992
		CA 2054316 A	06-05-1992
		CN 1061484 A	27-05-1992
		DE 69129616 D	23-07-1998
		DE 69129616 T	15-10-1998
		JP 5006569 A	14-01-1993
		US 5311494 A	10-05-1994
DE 29708978 U	10-07-1997	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82